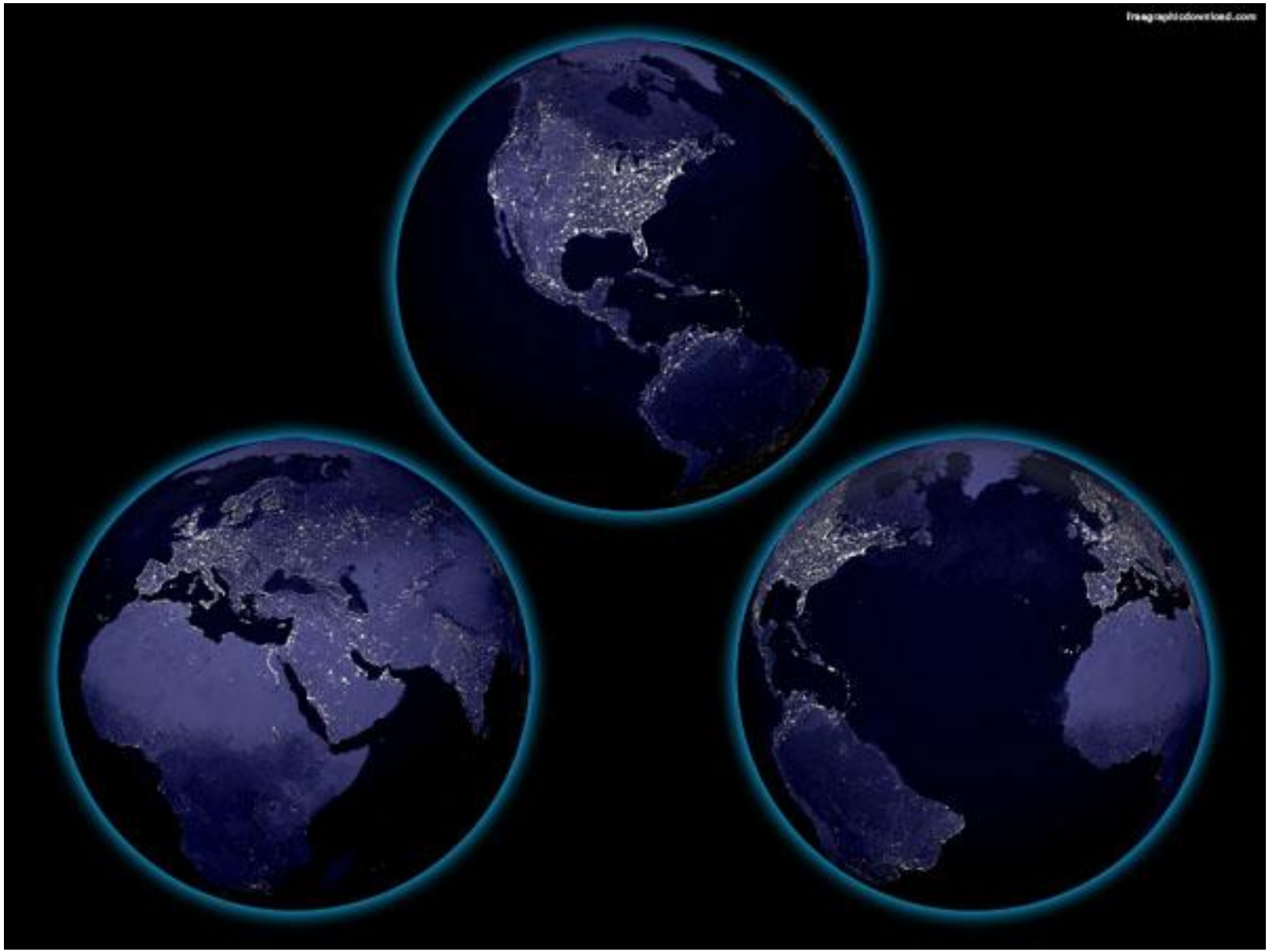
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Mind the Gap:
Science in the South

Workshop on Science-Policy Interface

May 21 2014

Southern Model of Science

- In place of Anglo-Saxon, Academy models: Science as Department of State
- More than 100 of these agencies via UNESCO in LDCs.
- Science as a field of enquiry subordinate to science as an instrument of development.
- Key function of these Departments is
- a) regulating research by foreign scientists within the state. (Bioprospecting, ethical research, licensing research sites.)
- b)Representing national interest in Global Public Goods.
- c) Negotiating, securing donor investment in Science.
- “When it comes to science, Africa is still more studied by foreigners than by its own people.”

Global Public Goods (and bads)

- Global panels, agencies BOTH study global issues AND primary instrument for transfer of scientific investment, knowledge, training from North to South.
- **Declining investment** at end of Twentieth Century in Global Public Goods.
- Research to Development Paradigm
- Public Health (AIDS, malaria, TB, diarrhea)
- Green Revolution (CGIAR $1b.)
- Environmental Monitoring (climate, biodiversity)
- Big Bang vs. Survival Science

The Science Divide

- **Scientific concentration**: 162 countries contribute less than one percent of the total peer reviewed scientific research
- **Digital divide** 9 African countries w/o Internet
- **Language divide** 82% of chemistry research available only in English and Russian (1980); even greater English concentration now.
- North/South vs. regional ties .

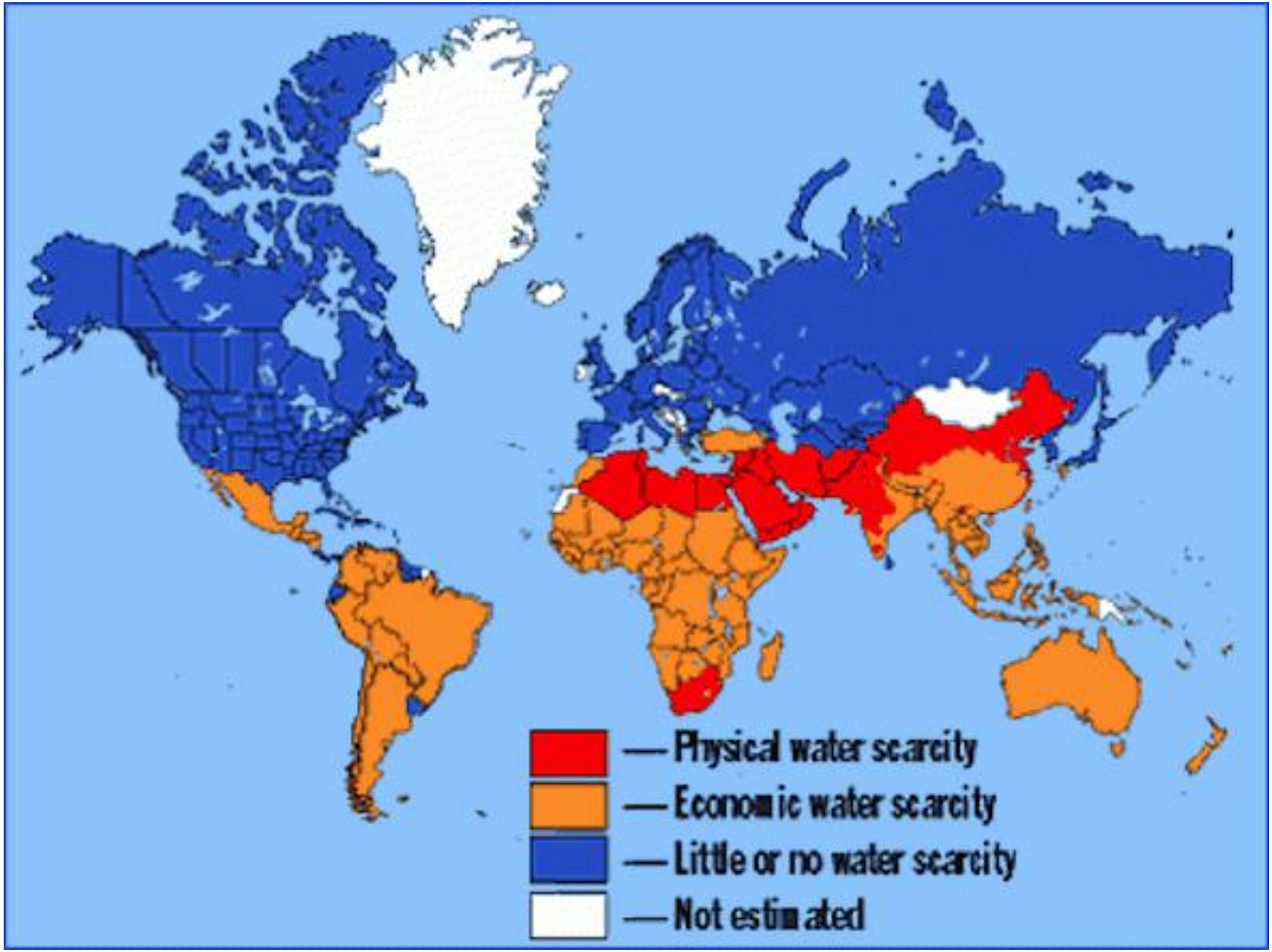
CHALLENGES IN DOING SCIENCE IN THE SOUTH

- Crisis State of the **Universities**
- **Brain Drain** to Northern Universities
- Social isolation: No **critical mass** for research teams
- **Money: No budget** for National Research Institutes
- Increased **costs** of scientific research ex: molecular biology.
- Dismantling of **State Scientific Capacity**
- **Infrastructure** weaknesses (electricity, bandwidth)

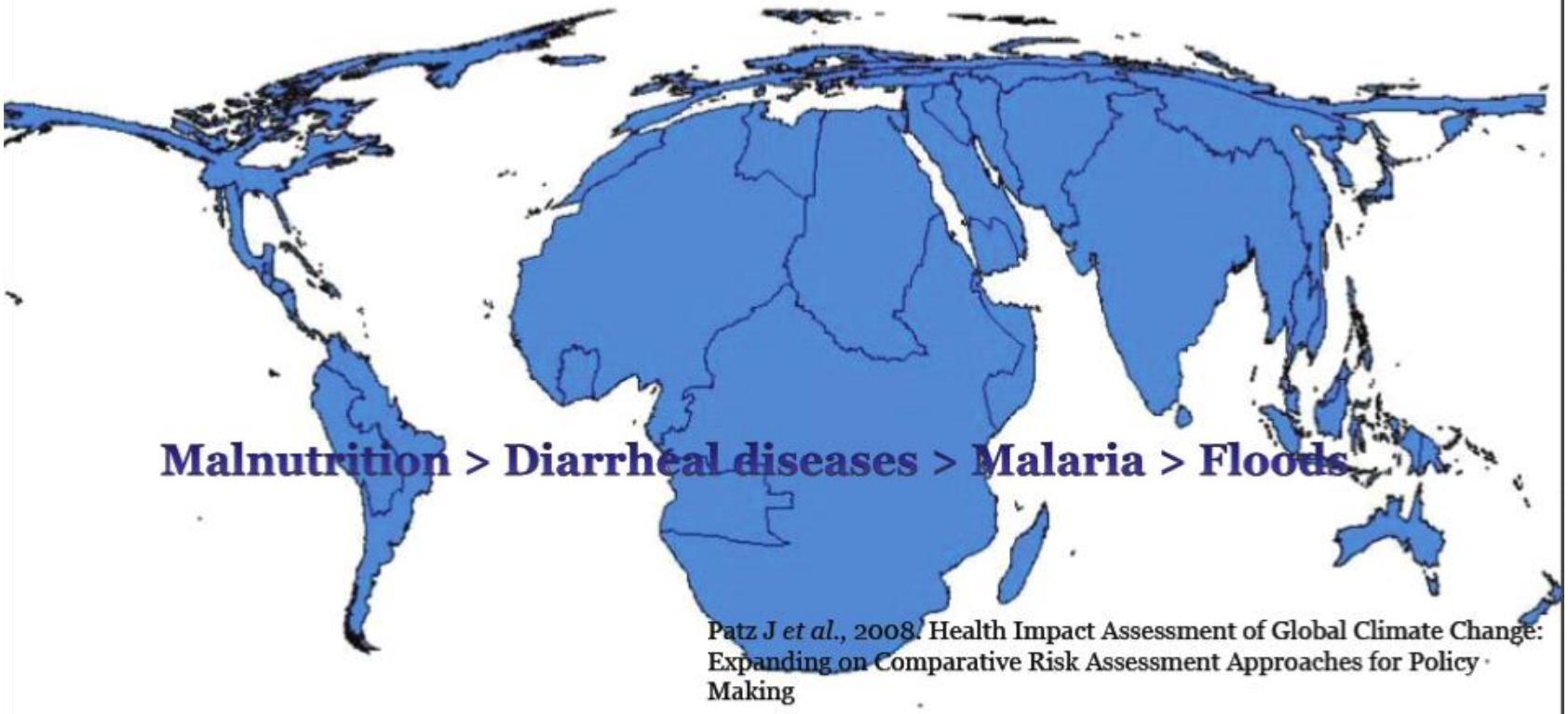
Does it Matter where Research Takes Place?

- Surely good science is good wherever it takes place?
- Hadley Centre modelling of Africa climate
- Meningitis research at Columbia
- Agricultural research at Land Grant Colleges, Guelph and Rothamstead.
- But will we ask the right questions?
- Can env. science be done offshore?

The Matthew Effect: Africa's Scientists and Climate Change


— Physical water scarcity
— Economic water scarcity
— Little or no water scarcity
— Not estimated

Global health impacts of Climate Change affect the poor disproportionately



Patz J *et al.*, 2008. Health Impact Assessment of Global Climate Change: Expanding on Comparative Risk Assessment Approaches for Policy Making

WHO regions scaled according to estimated annual mortality (per million people) in 2000. Based on burden-of-disease attribution to the climate change that occurred from 1970s to 2000 (McMichael *et al.*, 2003).

The Meningitis Belt

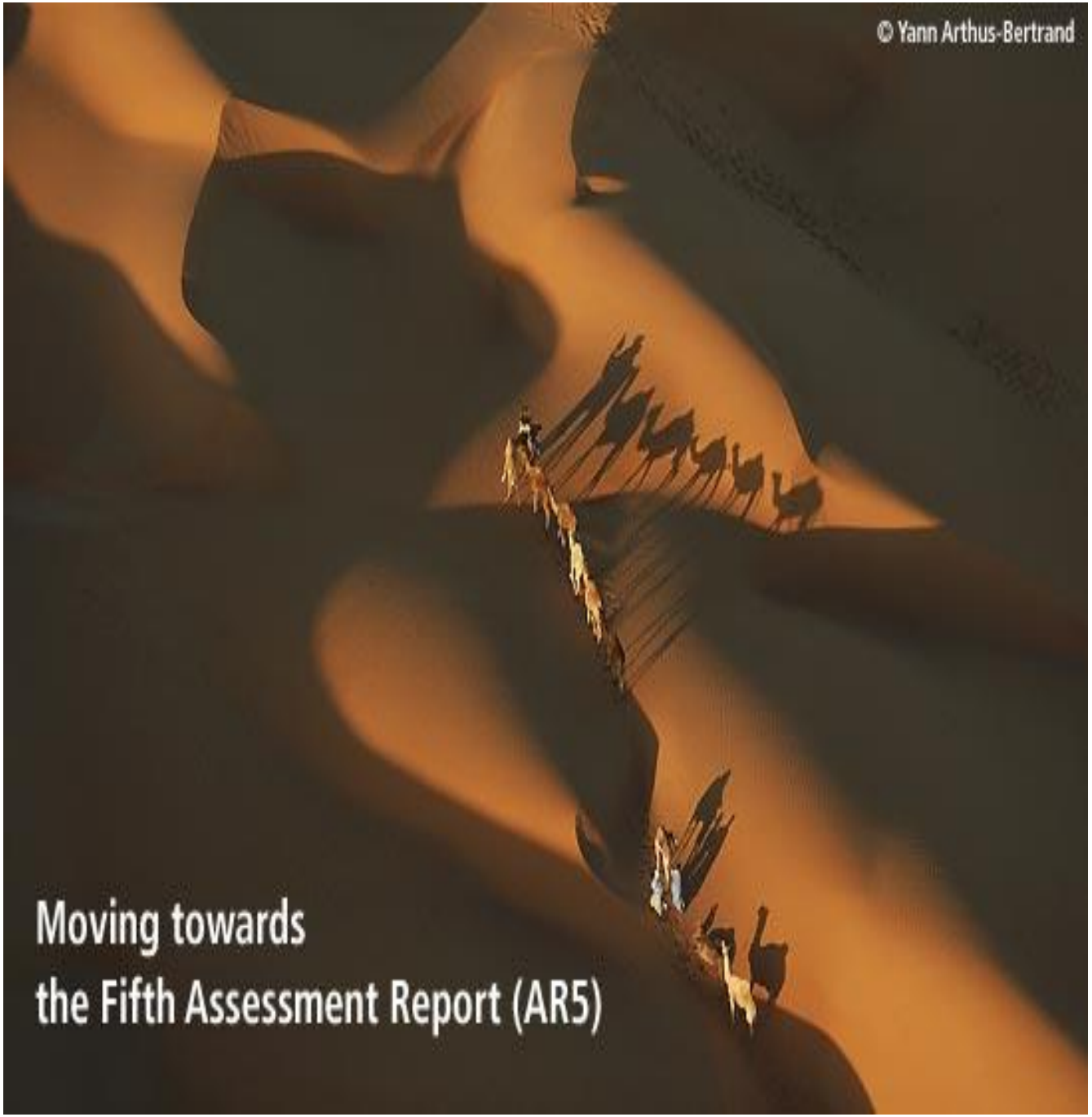
- 21 countries and 300 million people at risk
- 700 000 cases in the past 10 years
- 10-50 % case fatality rates
- 10-20 % of survivors suffer permanent brain damage
- Corresponds to spread of polio

BIODIVERSITY HOTSPOTS

25 % OF WORLD'S HOTSPOTS ARE IN AFRICA:

TO QUALIFY: .5% or 1,500 species of vascular plants are endemic, and it has to have lost at least 70% of its primary vegetation

AFRICA'S EQUATORIAL FORESTS AMONG MOST VULNERABLE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Moving towards
the Fifth Assessment Report (AR5)

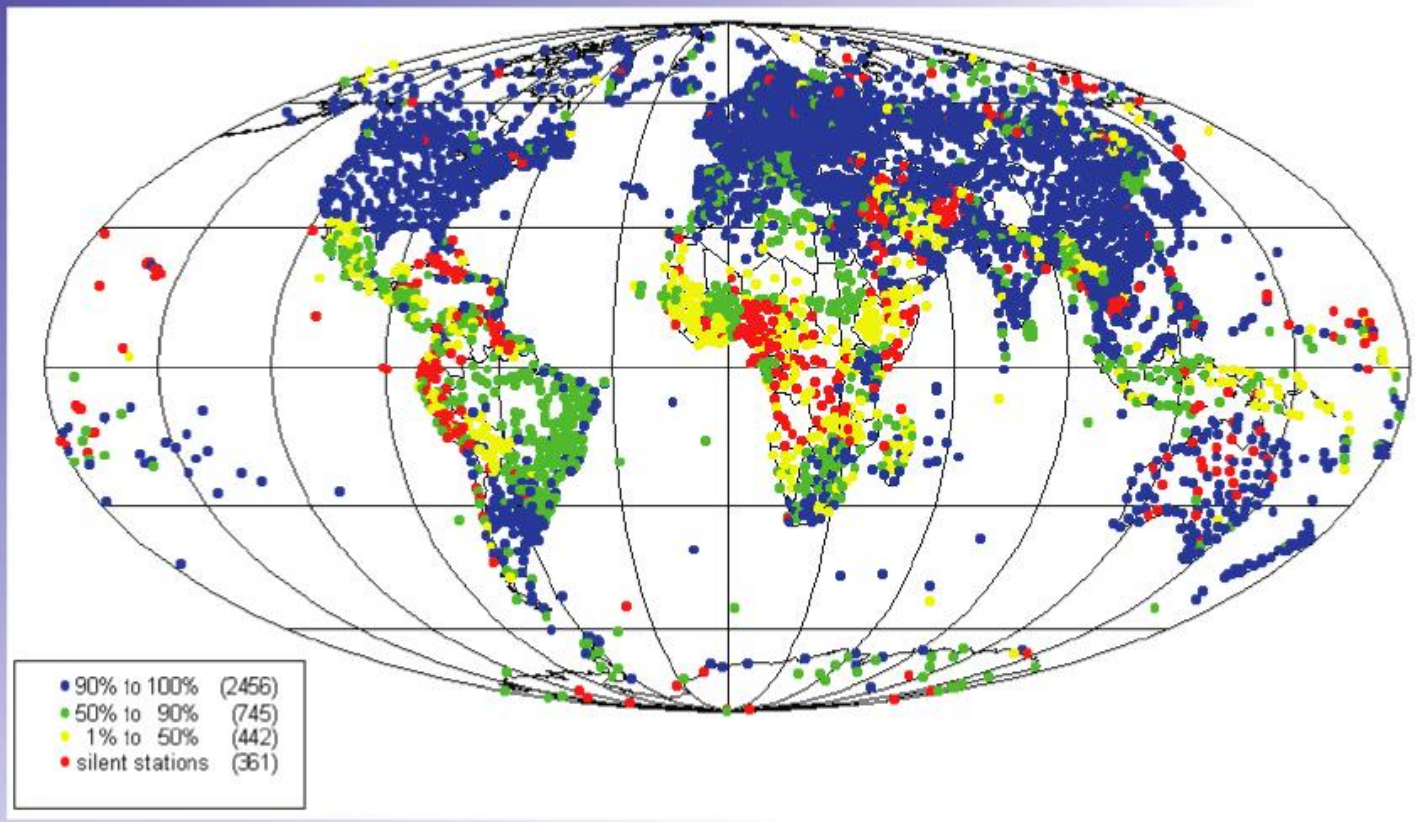
Science in the South: the Case of the IPCC

- 840 Scientists initially named to IPCC Fifth Review
- United States, largest, 192; UK, second, 63; Canada, 25. (33%)
- Positions of authority (coordinating lead authors) 39 of 110 come from US/UK/Cda (34%)
- China 34 Scientists; India 28; Brazil 26.
- 52 sub-Saharan African scientists involved in Fifth Review, drawn from 17 countries, 10 veterans, 2 CLAs –6% of the total.

Issues of Substance

- 5th Review synthesizes 73,000 published works (a quarter of them in Chinese). This represents a **100-fold increase in published peer review research** in 30 years.
- But weather data within Africa has deteriorated over past 30 years.
- Conflict in equatorial region affects data collection on state of forests, biodiversity, climate
- South Atlantic Ocean single biggest gap in knowledge on climate
- Oceans and tropical forest sinks remain critical issues for our GLOBAL understanding.

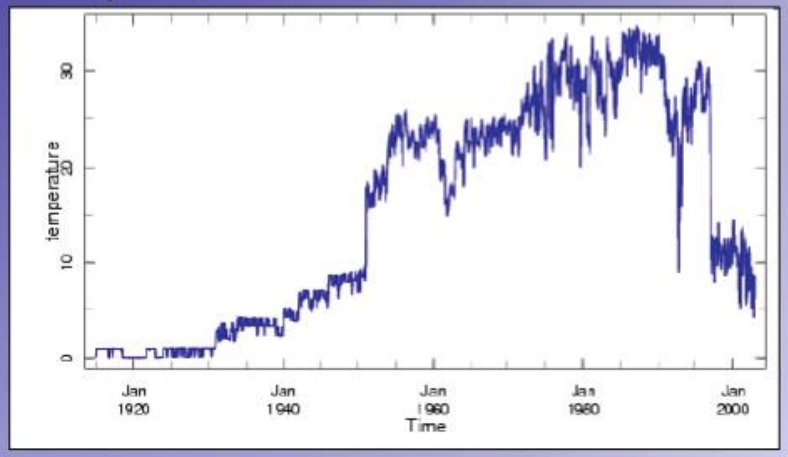
Improving Climate Observing Systems in Africa



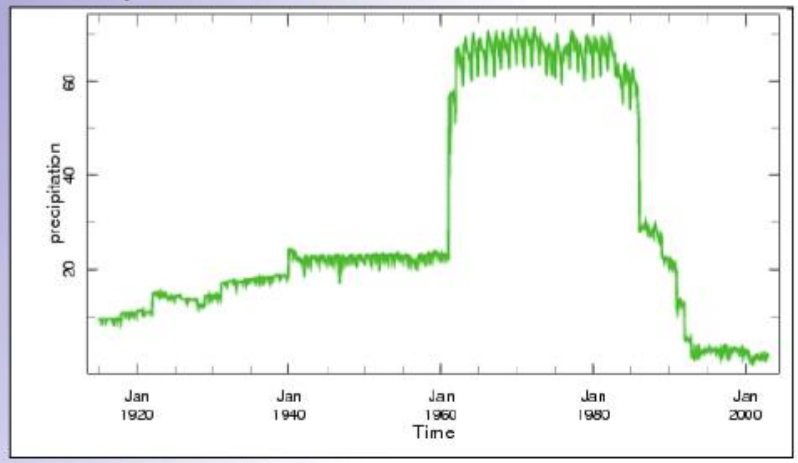
ClimDev-Africa - African Union initiative sponsored jointly by the African Development Bank, African Union Commission and the UN Economic Commission for Africa (APF, 2007).

Number of functioning climate observing stations in the public domain over time

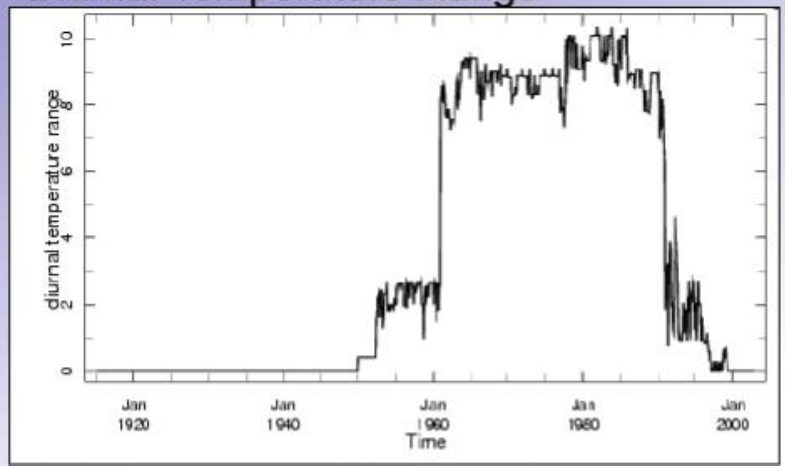
Temperature



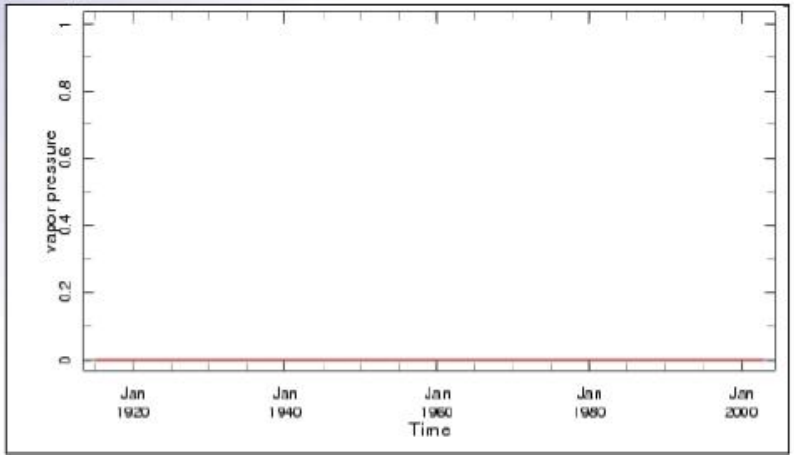
Precipitation



Diurnal Temperature Range



Vapor Pressure



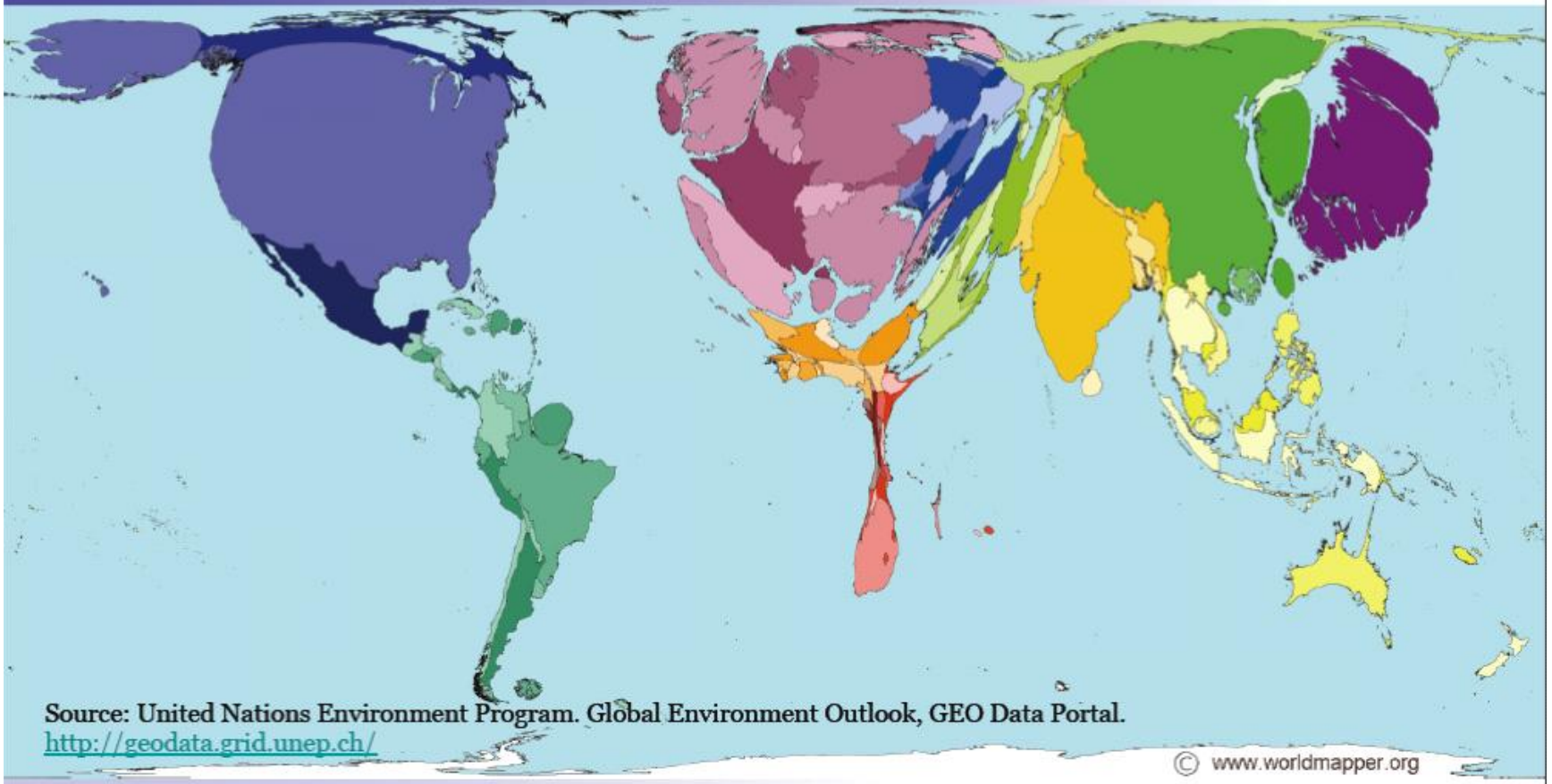
Initiatives for African Science

- Climate observation network (citizen science?)
- Regional IPCC
- Centres of excellence in climate research
- Virtual networks in Climate Science
- E-Journals for African climate science
- Training to integrate CC into research
- The Einstein project
- Science Journalism

Towards a G-20 in Science

- Northern Powers:
- Germany Russia Sweden Nethlands Finland Switz
- USA Canada UK
- Japan Korea
- Southern powers in science:
- China/Taiwan
- India Singapore Brazil Mexico South Africa Australia (Egypt).

Global Distribution of Wealth



Territory size represents the proportion of worldwide wealth - GDP is adjusted for local purchasing power.

A Tribute to Bob Scholes

- Systems ecologist, expert in savannas, Chief Scientist at CSIR South Africa
- Elected last week as foreign associate at US National Academy of Science: only 21 elected each year. Only second South African (paleontologist Philip Tobias.)
- CLO at IPCC, Millennium Assessment, GEOSS
- One of 100 most influential environmental authors based on publication citations.